

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/774,534 Confirmation No. 9797
Applicant : KATAKURA, Y. et al.
Filed : February 10, 2004
Title : STORAGE APPARATUS AND SHIELDING METHOD FOR
STORAGE APPARATUS
TC/AU : 2818
Examiner : TBA
Docket No. : 501.43508X00
Customer No.: 24956

PETITION TO MAKE SPECIAL
UNDER 37 CFR §1.102(d) (MPEP §708.02(VIII))

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Applicants petition the Commissioner to make the above-identified application special in accordance with 37 CFR §1.102(d). In support of this Petition, pursuant to MPEP § 708.02(VIII), Applicants state the following.

(A) REQUIRED FEE

This Petition is accompanied by the fee set forth in 37 CFR § 1.117(h). A Credit Card Payment Form in the amount of \$130 accompanies this Petition in satisfaction of the fee. The Commissioner is hereby authorized to charge any

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additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

(B) ALL CLAIMS ARE DIRECTED TO A SINGLE INVENTION

Claims 1-16 are pending in the application. All the pending claims of the application are directed to a single invention. If the Office determines that all claims in the application are not directed to a single invention, Applicant will make election without traverse as a prerequisite to the grant of special status.

The claimed invention, as embodied in independent claims 1 and 9, is generally directed to a storage apparatus having improved shielding. Under claim 1, the invention is a storage apparatus comprising: a storage control section including a first rack having electrical conductivity, channel control parts housed in the first rack, and disk control parts housed in the first rack, the channel control parts being communicably connected to an information processing apparatus and constructed to receive a data input/output request from the information processing apparatus, the disk control parts being communicably connected to hard disk drives for storing data and constructed to perform read/write of data from and to the hard disk drives in response to a data input/output request from the information processing apparatus; a storage drive section including a second rack having electrical conductivity, the hard disk drives, and relay parts for relaying communications between the hard disk drives and the disk control parts, the hard disk drives and the relay parts being housed in the second rack; and communication cables for communicably connecting the disk

control parts to the relay parts, each of the communication cables including a transmission medium through which to transmit data to be read or written by the disk control parts, a first conductor having electrical conductivity and surrounding the transmission medium with an insulator interposed therebetween, a second conductor having electrical conductivity and surrounding the first conductor with an insulator interposed therebetween, and an electrically nonconductive covering surrounding the second conductor, the first conductor being electrically conductibly connected to ground potential supply circuits provided in at least either the disk control parts or the relay parts, the second conductor being electrically conductibly connected to at least one of the first rack and the second rack.

Additionally, under independent claim 9, the invention is a shielding method for a storage apparatus including a storage control section including a first rack having electrical conductivity, channel control parts housed in the first rack, and disk control parts housed in the first rack, the channel control parts being communicably connected to an information processing apparatus and constructed to receive a data input/output request from the information processing apparatus, the disk control parts being communicably connected to hard disk drives for storing data and constructed to perform read/write of data from and to the hard disk drives in response to a data input/output request from the information processing apparatus, and a storage drive section including a second rack having electrical conductivity, the hard disk drives, and relay parts for relaying communications between the hard disk drives and the disk control parts, the hard disk drives and the relay parts being housed in the

second rack, the shielding method comprising the steps of: communicably connecting the disk control parts and the relay parts via communication cables each including a transmission medium through which to transmit data to be read or written by the disk control parts, a first conductor having electrical conductivity and surrounding the transmission medium with an insulator interposed therebetween, a second conductor having electrical conductivity and surrounding the first conductor with an insulator interposed therebetween, and an electrically nonconductive covering surrounding the second conductor; electrically conductibly connecting the first conductor to ground potential supply circuits provided in at least either the disk control parts or the relay parts; and electrically conductibly connecting the second conductor to at least one of the first rack and the second rack.

(C) PRE-EXAMINATION SEARCH

A careful and thorough pre-examination search has been conducted, directed to the invention as claimed. The pre-examination search was conducted in the following *US Manual of Classification* areas:

| <u>Class</u> | <u>Subclass</u> |
|---------------------|------------------------------|
| 174 | 35R, 102R, 105R, 107 |
| 307 | 91 |
| 333 | 12 |
| 361 | 684, 685, 724, 727, 733, 818 |

Additionally, a keyword search was conducted on the USPTO's EAST database, including US patents, published US patent applications, and the European and Japanese patent abstract databases.

(D) DOCUMENTS DEVELOPED BY THE PRE-EXAMINATION SEARCH

The documents located by the pre-examination search are listed below.

These documents were made of record in the present application by the Information Disclosure Statement filed March 30, 2005 (copy attached).

| <u>Document No.</u> | <u>Inventor</u> |
|---------------------|--------------------------|
| US 4376920 | Smith, Kenneth L. |
| US 4642417 | Ruthrof, Klaus et al. |
| US 5033091 | Bond, Matthew R. |
| US 5223806 | Curtis, Robert A. et al. |
| US 5548082 | Palmer, Donald E. |
| US 6185065 | Hasegawa, Hiroshi et al. |
| US 6310286 | Troxel, Robert V. et al. |
| US 6498890 | Kimminau, Michael D. |
| US 6686538 | Yamamoto, Takashi |

Additionally, the following document was made of record in the present application by the Information Disclosure Statement filed February 10, 2004 (copy attached).

| <u>Document No.</u> | <u>Inventor</u> |
|---------------------|----------------------|
| JP11-265233 | Yamanashi, A. et al. |

Because all of the above-listed documents are already of record in the present application, in accordance with MPEP § 708.02(VIII)(D), additional copies of these documents have not been submitted with this Petition.

(E) DETAILED DISCUSSION OF THE REFERENCES

Those of the above-listed documents deemed to be most closely-related to the present matter encompassed by the claims are discussed below, pointing out,

with the particularity required by 37 CFR 1.111 (b) and (c), how the claimed present matter is patentable over the teachings of these documents.

1. Discussion of the Invention

The present invention teaches a storage apparatus and a shielding method for the storage apparatus. As set forth in claims 1 and 9, the storage apparatus includes a storage control section including a first rack, and a storage drive section including a second rack, with communication cables for communicably connecting disk control parts in the first rack to relay parts in the second rack. Each communication cable includes a transmission medium for transmitting data, an insulator and a first conductor surrounding the transmission medium, and an insulator and a second conductor surrounding the first conductor, with the first conductor being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and the second conductor being connected to at least one of the first and second electrically conductive racks. The prior art does not teach or suggest such a storage apparatus or shielding method for a storage apparatus.

2. Discussion of the References Believed to be Most-Closely Related

The patent to Smith, US 4376920, shows a shielded RF transmission cable that includes at least one center conductor surrounded by a cylindrical dielectric layer, which is surrounded by an inner metallic sheath, which is surrounded by an intermediate dielectric layer, which is surrounded by an outer metallic sheath, which is surrounded by an outer jacket. (See, e.g., column 4, line 33, through column 4,

line 39.) Thus, Smith teaches a shielded cable for suppressing electromagnetic and radiofrequency interference. However, Smith does not teach a storage apparatus or method for shielding a storage apparatus, and does not teach connecting one of the metallic sheaths to ground potential supply circuits provided in either disk control parts or relay parts in a storage apparatus, or connecting a second of the metallic sheaths to at least one of first and second electrically conductive racks containing components of a storage apparatus. Accordingly, Smith does not teach the present invention in which the first conductor is electrically conductibly connected to ground potential supply circuits provided in at least either the disk control parts or the relay parts, and the second conductor is electrically conductibly connected to at least one of the first rack and the second rack, as set forth in claims 1 and 9.

The patent to Ruthrof, US 4642417, shows a design for a shielded cable that includes an inner conductor, which is surrounded by a dielectric, which is surrounded by a braided inner shielding, which is surrounded by a second insulation, which is surrounded by an outer braided shield, which is surrounded by an outer jacket. The cable may be employed for ultrasonic measurements and for reducing interference sensitivity in data processing. (See, e.g., column 2, line 26, through column 3, line 13.) However, Ruthrof does not disclose a storage apparatus, or the use of the cable in a storage apparatus, or how the cable would be installed for reducing interference in data processing. Thus, Ruthrof does not disclose connecting one of the shields to ground potential supply circuits provided in either disk control parts or

relay parts in a storage apparatus, or connecting a second of the shields to at least one of first and second electrically conductive racks containing components of the storage apparatus. Accordingly, Ruthrof does not teach the present invention in which the first conductor is electrically conductibly connected to ground potential supply circuits provided in at least either the disk control parts or the relay parts, and the second conductor is electrically conductibly connected to at least one of the first rack and the second rack, as set forth in claims 1 and 9.

The patent to Bond, US 5033091, shows a cable interconnection for an audio component system. As illustrated in FIGS. 6 and 7, a cable has a center conductor adapted to couple a source negative terminal with a load negative terminal, while an outer conductor is adapted for grounding, and an intermediate conductor is adapted to be coupled electrically only to the load negative terminal. (See, e.g., column 3, line 52, through column 4, line 11.) Thus, while Bond teaches a connection suitable for an audio component system, Bond does not teach a shielding arrangement for a storage apparatus, and does not teach a storage apparatus with first and second electrically conductive racks, and communications cables between the disk control parts in one rack and relay parts in another rack, with a first conductor of the cables being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and a second conductor of the cables being connected to at least one of the first and second electrically conductive racks, as set forth in claims 1 and 9.

The patent to Curtis, US 5223806, shows a method and apparatus for reducing electromagnetic interference and emission associated with computer network interfaces. A shielded twisted pair cable 20 couples two computer network adapters 16, 18 using connectors 132, 134. Cable 20 includes a shield 20A which is electrically connected to a bulkhead 120 of a network interface card 22, which, in turn, is connected to a computer housing and ground plane. (See, e.g., column 3, lines 9-32, column 5, lines 46-64, and column 6, lines 31-52.) However, Curtis only discloses a single outer shield 20A, and does not include a second shield that is connected to ground potential supply circuits. Thus, Curtis does not teach the present invention, including a storage apparatus with first and second electrically conductive racks, and communications cables between the disk control parts in one rack and relay parts in another rack, with a first conductor of the cables being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and a second conductor of the cables being connected to at least one of the first and second electrically conductive racks, as set forth in claims 1 and 9.

The patent to Palmer, US 5548082, shows a passive signal shielding structure for short wire cable, and includes a cable 10 having a shielding sheath 18. An inductor 20, such as a coil, is included for connecting the shielding sheath 18 to local ground 24. FIG. 3 illustrates an embodiment that includes a ground line 53 twisted

together along the signal path within sheath 18, and connected at one end to signal ground 38, and the other end to signal ground 39. (See, e.g., column 2, lines 32-63, and column 3, lines 22-34.) Thus, Palmer lacks a second shielding conductor, and Palmer does not teach the present invention, including a storage apparatus with first and second electrically conductive racks, and communications cables between the disk control parts in one rack and relay parts in another rack, with a first conductor of the cables being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and a second conductor of the cables being connected to at least one of the first and second electrically conductive racks, as set forth in claims 1 and 9.

The patent to Hasegawa, US 6185065 shows an electromagnetic shielding apparatus for a memory storage disk module. The memory storage disk module includes a disk unit and a control circuit board attached to the disk unit. A cover means covers at least the disk unit and the control circuit board for shielding an emission of electromagnetic waves from at least the control circuit board. The cover means includes front and rear panel portions having small apertures allowing air to flow, and a connector means arranged on or near the rear panel portion and electrically connectable to the disk unit or the control circuit board. The connector means is exposed from the rear panel portion and has a plug-in means able to be coupled with an external unit. As illustrated in FIG. 11, a rack or cabinet of a memory storage disk system includes trays that can accommodate the shielded disk

modules. (See, e.g., column 4, line 57, through column 5, line 39, and column 7, lines 18-31.) Accordingly, while Hasegawa discloses a shielded storage disk module, Hasegawa does not teach the use of shielded communications cables, and Hasegawa does not teach a storage apparatus with first and second electrically conductive racks, and communications cables between the disk control parts in one rack and relay parts in another rack, with a first conductor of the cables being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and a second conductor of the cables being connected to at least one of the first and second electrically conductive racks, as recited in claims 1 and 9.

The patent to Troxel, US 6310286, shows a quad cable construction for an IEEE 1394 data transmission line. The cable includes conductors 22, 24, 26, and 28, an inner shield 32, and an outer shield 36. Outer shield 36 is electrically isolated from inner shield 32 by a separator 34. Outer shield 36 and inner shield 32 are connected to ground through the connector housing when the cable is connected to a receiving connector (column 6, lines 29-32). Within the unit electronics at the port housing the receiving connector, a capacitor C1 is preferably coupled between inner shield 32 and outer shield 36 to maintain electrical isolation between the shields (column 6, lines 33-37). Thus, Troxel connects both shields to the same ground, unlike the present invention, in which one conductor is connected to the ground potential supply circuits and the other conductor is connected to an electrically

conductive rack. Accordingly, Troxel does not teach a storage apparatus with first and second electrically conductive racks, and communications cables between the disk control parts in one rack and relay parts in another rack, with a first conductor of the cables being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and a second conductor of the cables being connected to at least one of the first and second electrically conductive racks, as set forth in claims 1 and 9.

The patent to Kimminau, US 6498890, shows a storage enclosure and connector cable that includes the use of conventional shielded cables 236, 238, and 242. The use of shielded cables 236, 238, 242, reduces the susceptibility of the connector cable to interference difficulties. (See, e.g., column 3, lines 27-65.) However, Kimminau does not disclose any connection details for the shielded cables, and does not disclose a shielded cable having a first conductor and a second conductor. Accordingly, Kimminau does not teach a storage apparatus with first and second electrically conductive racks, and communications cables between the disk control parts in one rack and relay parts in another rack, with a first conductor of the cables being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and a second conductor of the cables being connected to at least one of the first and second electrically conductive racks, as set forth in claims 1 and 9.

The patent to Yamamoto, US 6686538, shows a method for connecting electronic devices that includes a connecting cable having a first external conductor and a second external conductor spaced adjacent to the first external conductor and being less than the length of the first external conductor. Yamamoto teaches connecting the first external conductor to a frame of a reference potential of a first electronic device, while the second external conductor is connected to a frame of a reference potential of a second electronic device (column 6, lines 7-16). Thus, Yamamoto teaches connecting both the external conductors to the frames on opposed electronic devices, rather than connecting one of the conductors to at least one rack, and one conductor to at least one ground potential supply circuit, as in the present invention. Accordingly, Yamamoto does not teach a storage apparatus with first and second electrically conductive racks, and communications cables between the disk control parts in one rack and relay parts in another rack, with a first conductor of the cables being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and a second conductor of the cables being connected to at least one of the first and second electrically conductive racks, as recited in claims 1 and 9.

3. Remaining References

The remaining reference was provided as background information, and also does not show or suggest the present invention. The Japanese patent to Yamanashi, JP 11-265233, shows a disk array subsystem that includes shielding in

the case, but which does not include shielded communication cables. Accordingly, Yamanashi does not teach communications cables between disk control parts in one rack and relay parts in another rack, with a first conductor of the cables being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and a second conductor of the cables being connected to at least one of the first and second electrically conductive racks, as set forth in claims 1 and 9.

CONCLUSION

Thus, from the foregoing, it is apparent that none of the above-discussed documents teach a storage apparatus that includes a storage control section including a first rack, and a storage drive section including a second rack, with communication cables for communicably connecting disk control parts in the first rack to relay parts in the second rack, wherein each communication cable includes a transmission medium for transmitting data, an insulator and a first conductor surrounding the transmission medium, and an insulator and a second conductor surrounding the first conductor, with the first conductor being connected to ground potential supply circuits provided in at least either the disk control parts or relay parts, and the second conductor being connected to at least one of the first and second electrically conductive racks. Accordingly, independent claims 1 and 9 are patentable over the above-discussed documents.

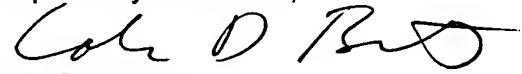
The Applicants submit that the foregoing discussion demonstrates the patentability of the independent claims over the closest-known prior art, taken either singly, or in combination. The remaining claims depend from the independent claims, claim additional features of the invention, and are patentable at least because they depend from allowable base claims. Accordingly, the requirements of 37 CFR §1.102(d) having been satisfied, the Applicants request that this Petition to Make Special be granted and that the application be examined according to prescribed procedures set forth in MPEP §708.02 (VIII).

The Applicants prepared this Petition in order to satisfy the requirements of 37 C.F.R. §1.102(d) and MPEP §708.02 (VIII). The pre-examination search required by these sections was "directed to the invention as claimed in the application for which special status is requested." MPEP §708.02 (VIII). The search performed in support of this Petition is believed to be in full compliance with the requirements of MPEP §708.02 (VIII); however, Applicants make no representation that the search covered every conceivable search area that might contain relevant prior art. It is always possible that prior art of greater relevance to the claims may exist. The Applicants urge the Examiner to conduct his or her own complete search of the prior art, and to thoroughly examine this application in view of the prior art cited above and any other prior art that may be located by the Examiner's independent search.

Further, while the Applicants have identified and discussed certain portions of each cited reference in order to satisfy the requirement for a "detailed discussion of the references, which discussion points out, with the particularly required by 37

C.F.R. §1.111(b) and (c), how the claimed present matter is patentable over the references" (MPEP §708.02(VIII)), the Examiner should not limit review of these documents to the identified portions, but rather is urged to review and consider the entirety of each reference.

Respectfully submitted,


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Date: 4/19/05

| | | | |
|--|--|---|-------------------|
| <p>Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.</p> <p>PETITION FEE Under 37 CFR 1.17(f), (g) & (h)</p> <p>TRANSMITTAL (Fees are subject to annual revision)</p> <p>Send completed form to: Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450</p> | | <p><i>APR 19 2005</i></p> <p><i>SEARCHED</i></p> <p><i>INDEXED</i></p> <p><i>MAILED</i></p> <p><i>FILED</i></p> | <p><i>STW</i></p> |
| | | <p><i>Application Number</i></p> <p>10/774,534</p> | |
| | | <p><i>Filing Date</i></p> <p>February 10, 2004</p> | |
| | | <p><i>First Named Inventor</i></p> <p>Y. KATAKURA, et al</p> | |
| | | <p><i>Art Unit</i></p> <p>2818</p> | |
| | | <p><i>Examiner Name</i></p> <p></p> | |
| | | <p><i>Attorney Docket Number</i></p> <p>501.43508X00</p> | |

Enclosed is a petition filed under 37 CFR §1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)). Payment of \$ 130.00 is enclosed.

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.

Payment of Fees (small entity amounts are NOT available for the petition (fees)

The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 50-1417:

petition fee under 37 CFR 1.17(f), (g) or (h) any deficiency of fees and credit of any overpayments
Enclose a duplicative copy of this form for fee processing.

Check in the amount of \$ _____ is enclosed.

Payment by credit card (From PTO-2038 or equivalent enclosed). Do not provide credit card information on this form.

Petition Fees under 37 CFR 1.17(f): Fee \$400 Fee Code 1462

For petitions filed under:

§ 1.53(e) - to accord a filing date.
§ 1.57(a) - to according a filing date.
§ 1.182 - for decision on a question not specifically provided for.
§ 1.183 - to suspend the rules.
§ 1.378(e) for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.
§ 1.741(b) - to accord a filing date to an application under §1.740 for extension of a patent term.

Petition Fees under 37 CFR 1.17(g): Fee \$200 Fee code 1463

For petitions filed under:

§1.12 - for access to an assignment record.
§1.14 - for access to an application.
§1.47 - for filing by other than all the inventors or a person not the inventor.
§1.59 - for expungement of information.
§1.103(a) - to suspend action in an application.
§1.136(b) - for review of a request for extension of time when the provisions of section 1.136(a) are not available.
§1.295 - for review of refusal to publish a statutory invention registration.
§1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.
§1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.
§1.550(c) - for patent owner requests for extension of time in ex parte reexamination proceedings.
§1.956 - for patent owner requests for extension of time in inter partes reexamination proceedings.
§ 5.12 - for expedited handling of a foreign filing license.
§ 5.15 - for changing the scope of a license.
§ 5.25 - for retroactive license.

Petition Fees under 37 CFR 1.17(h): Fee \$130 Fee Code 1464

For petitions filed under:

§1.19(g) - to request documents in a form other than that provided in this part.
§1.84 - for accepting color drawings or photographs.
§1.91 - for entry of a model or exhibit.
§1.102(d) - to make an application special.
§1.138(c) - to expressly abandon an application to avoid publication.
§1.313 - to withdraw an application from issue.
§1.314 - to defer issuance of a patent.

| | | | |
|-------------------|-------------------------|-----------------------------------|----------------|
| Name (Print/Type) | Colin D. Barnitz | Registration No. (Attorney/Agent) | 35,061 |
| Signature | <i>Colin D. Barnitz</i> | Date | April 19, 2005 |

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.